SEMIC presentation to CNIG

November
2025

14

SEMIC – Phase 16

interoperable
europe

Agenda

01   **What is SEMIC?**

02   **AI for interoperability at SEMIC**

03   **SEMIC data modelling assistant**

04   **Discussion**

European
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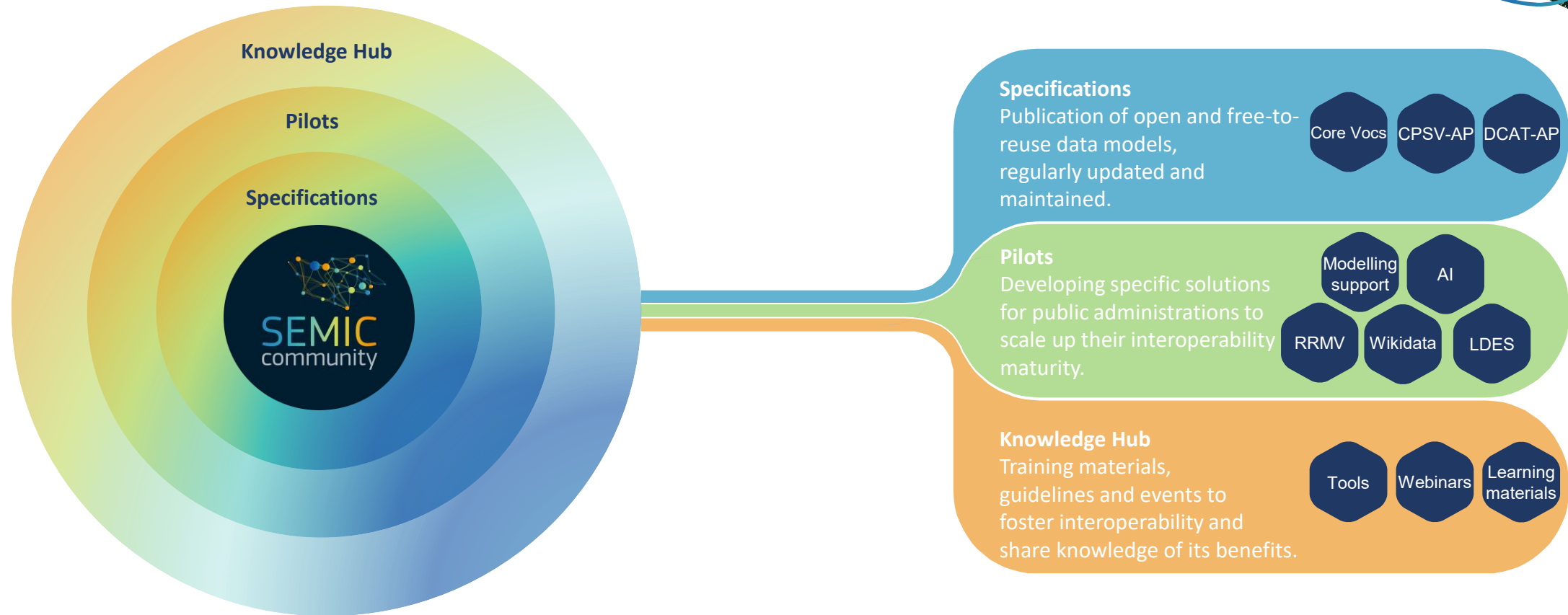What is SEMIC?

Introduction to SEMIC

The objectives of the SEMIC action are to promote Semantic Interoperability amongst the EU Member States by:
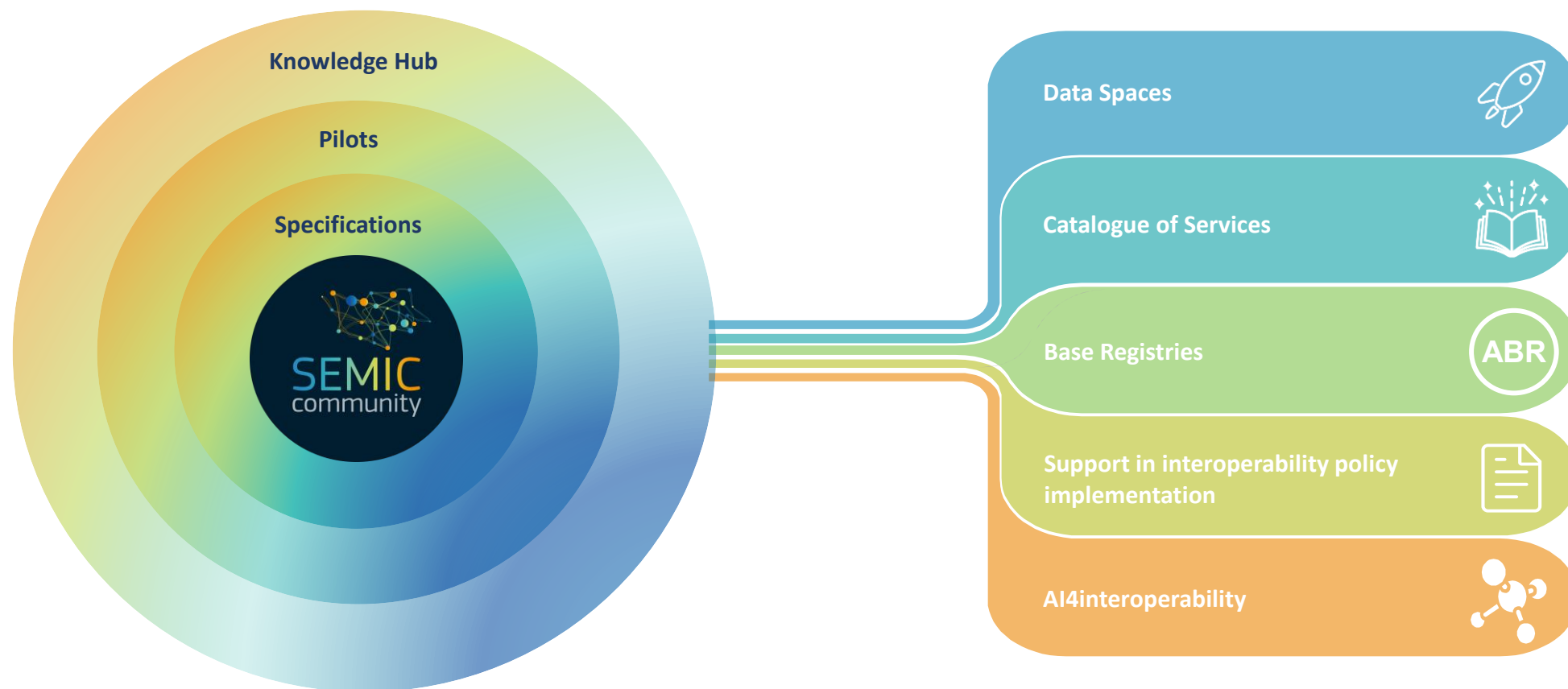
> Promoting the share and reuse of semantic assets, experience and tools and facilitating agreements in key areas.

> Identifying opportunities for alignment on semantic definitions, metadata and reference data sources with special focus on identification and definitions of Core Concepts / Vocabularies.

> Raising awareness on the importance of data and metadata management.

SEMIC

SEMIC's mission is to promote Semantic Interoperability amongst the EU Member States and deliver pragmatic support to help build an Interoperable Europe.

Knowledge Hub

Pilots

Specifications

SEMIC community

Specifications
Publication of open and free-to-reuse data models, regularly updated and maintained.

Core Vocs   CPSV-AP   DCAT-AP

Pilots
Developing specific solutions for public administrations to scale up their interoperability maturity.

Modelling support   AI
RRMV   Wikidata   LDES

Knowledge Hub
Training materials, guidelines and events to foster interoperability and share knowledge of its benefits.

Tools   Webinars   Learning materials

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SEMIC Focus Areas

Knowledge Hub

Pilots

Specifications

SEMIC community

Data Spaces

Catalogue of Services

Base Registries — ABR

Support in interoperability policy implementation
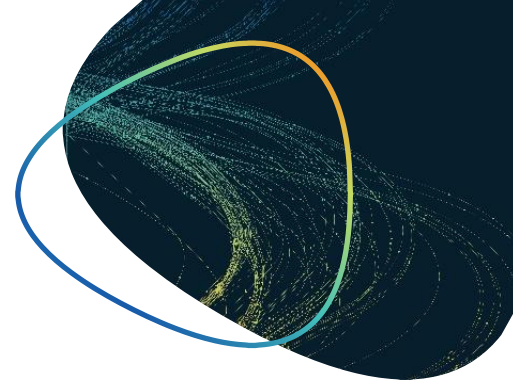
AI4interoperability

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SEMIC Service Offering

SEMIC Service offering

SEMIC's goal is to deliver pragmatic support to help build an interoperable Europe.

Specifications

Publication and maintenance of open and free-to-reuse data models, with regular updates

Pilots

Developing specific solutions for public administrations to scale up their interoperability maturity

Toolkit

Provision of an accessible European Toolchain for data extraction, transformation and loading

Knowledge Hub

Training materials, guidelines and events to foster interoperability and share knowledge of its benefits

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Toolkit

SEMIC Action has built up a set of tools and the practices to **generate and update data specifications**, as well as **propagating the changes** to models, documentation and the relevant serialisation formats.
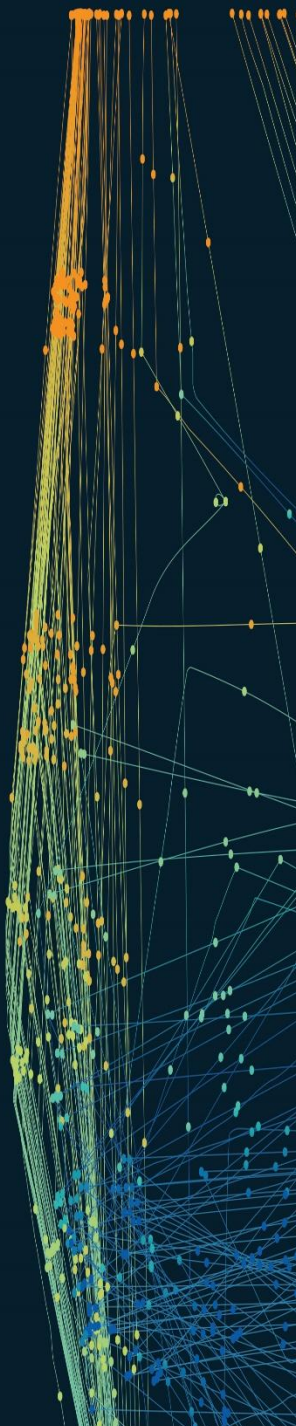
Tooling for semantic interoperability

SEMIC offers technical guidance and support for the SEMIC community by coordinating, creating and recommending essential tools to enhance semantic interoperability on a decentralised level.
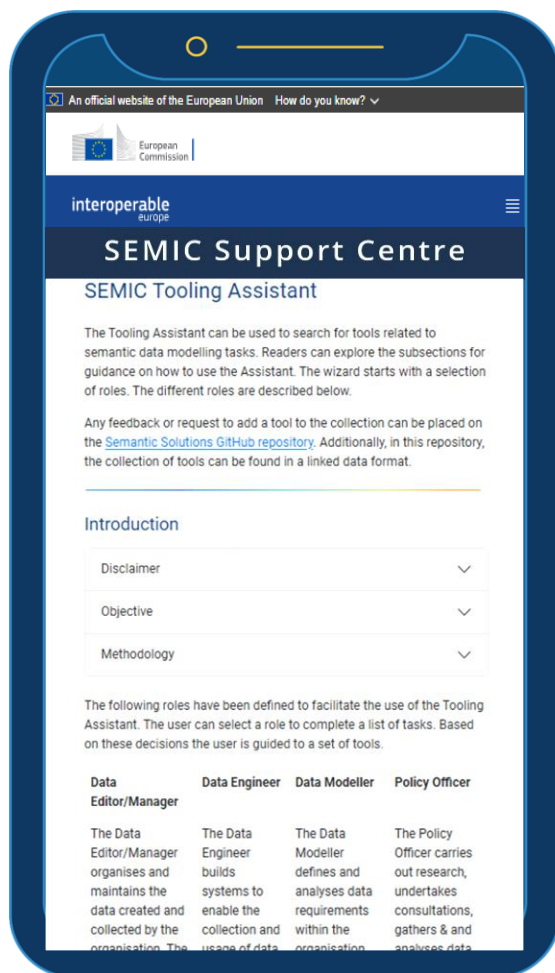
Modelling data specifications

SEMIC continually investigates the best methods and tools for creating and publishing data specifications. To this end, a guide was published to support semantic modellers in finding the right workflow and tools to create and publish semantic standards

Finding and reusing semantic artefacts

Together with a community-based working group, SEMIC is setting up the conceptual framework for future creation of an EU-wide Registry of Semantic Assets

Applying semantic standards in different environments

SEMIC also supports Member States in applying semantic standards in their own environment. In the past, a set of pilot tools was created, and recently a tooling assistant was published to guide tooling decisions.
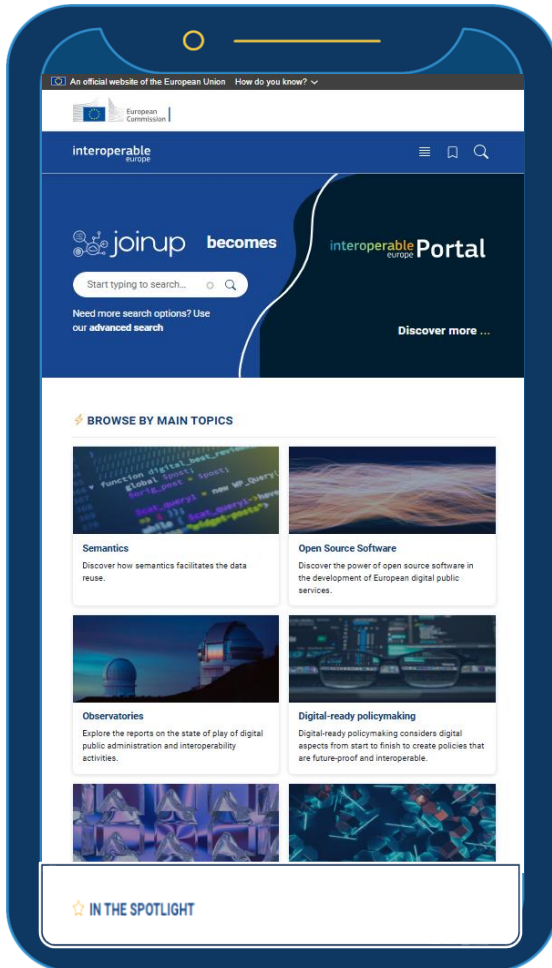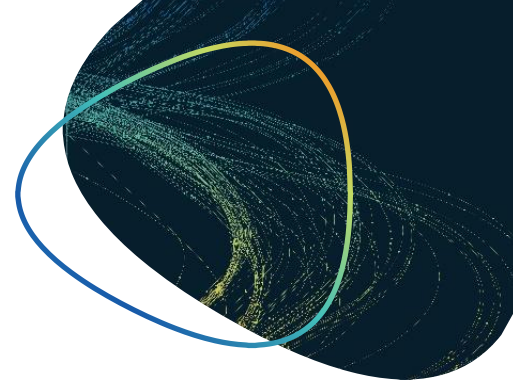
Go to Toolkit page here

Interoperable Europe Portal

Interoperable Europe Portal

Your one-stop-shop for shared and reusable interoperability solutions

What is it?

- It is an enabler for cross-border cooperation, free flow of information, exponential innovation.
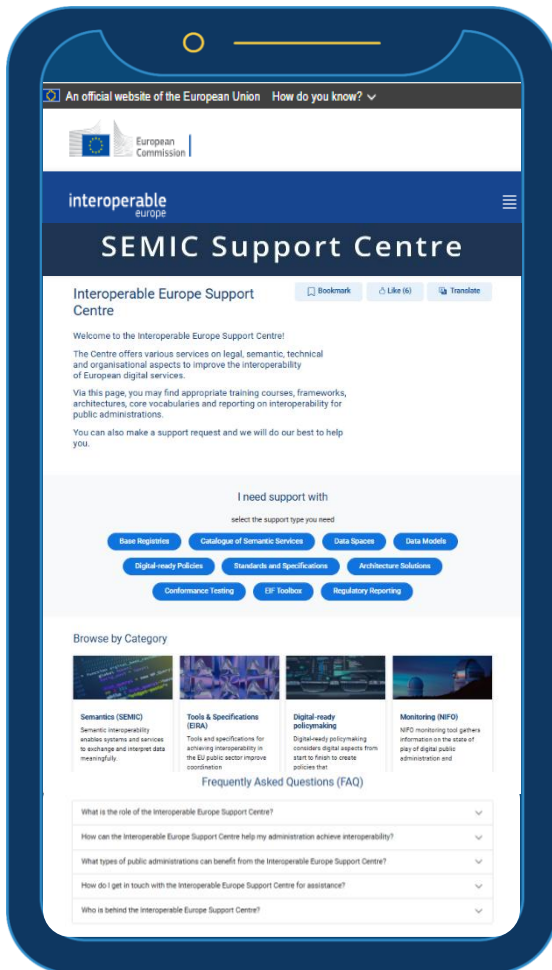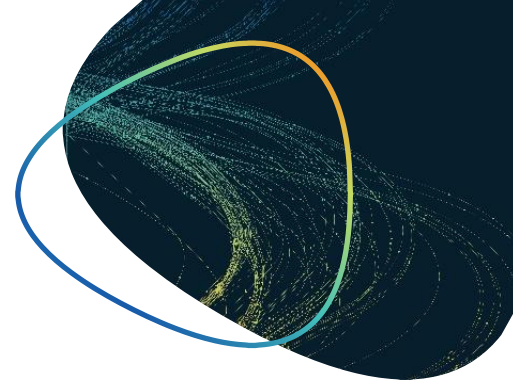
Who is it for?

- Public officers and technical experts
- Any public organisation in its interoperable journey

SEMIC Support Centre

Your one-stop-shop for all semantic interoperability challenges

What is it?

- Collection on the Interoperable Europe portal

- Concrete and direct support to all stakeholders through our helpdesk and GitHub

- Collects good practices and serves as a knowledge hub on semantic interoperability aspects

Who is it for?

- Public officers and technical experts

- Any public organisation in its interoperable journey

AI for Interoperability

AI4 interoperability

Empower interoperability through AI-driven solutions. Leverage advanced AI models to bridge data silos, foster collaboration, and drive innovation.

Data Spaces
Catalogue of Services
Base Registries   ABR
Support the implementation of legislation
AI4interoperability

ML-DCAT-AP

MLDCAT-AP is a semantic model in the field of machine learning. Its objective is to extend the use of DCAT-AP. It facilitates standardised descriptions of a machine learning process, together with their datasets, quality measured on the datasets and citing papers. The model was developed in collaboration with OpenML.

Learning materials

Some of the trainings developed are particularly relevant in the area of AI:
- [Introduction to Artificial Intelligence for Public Service Interoperability](#)

Proof-of-concept & MVP

Pilot projects to demonstrate how AI can improve semantic solutions through automation and data insights; or facilitate semantic interoperability with applicable standards.

Studies & research

SEMIC completed a study in the field of Generative AI. Our team carried-out an analysis on the impact of domain adaptation on two state-of-the-art models.

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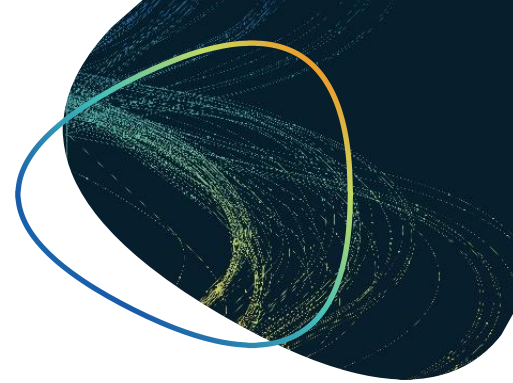
Proof-of-concept & MVP

To harness the potential of AI at supporting interoperability (through automatic semantic alignment, vocabulary extraction, ontology extension, data modelling, …), SEMIC has worked on building proof-of-concepts (and minimum viable products) for three different use cases:

Knowledge Extraction

In collaboration with DG GROW, SEMIC developed an AI tool to extract and visualise insights (topics, dates, actions) from a large set of pledges on the Transition Pathway for Tourism.

Data Modelling

To support the work of data modellers, SEMIC is exploring a prototype of chatbot that facilitates the reuse of classes or properties, the visualisation of data models, …
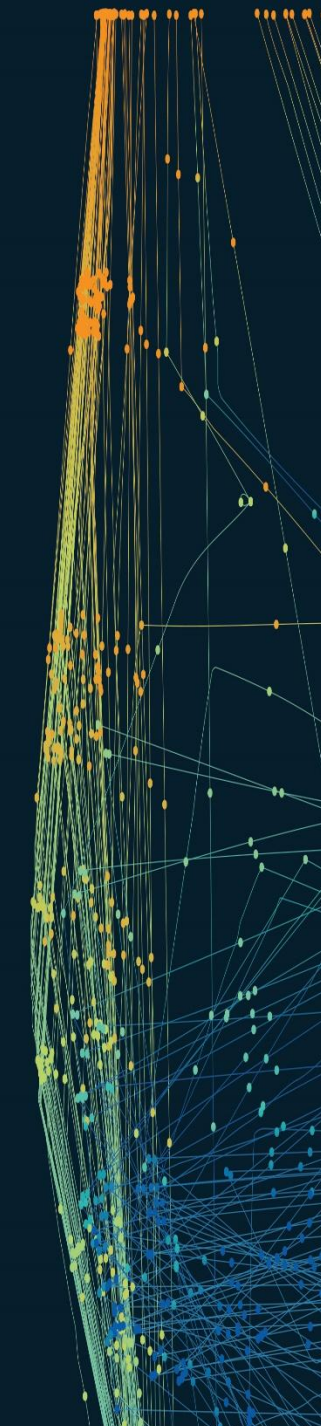
Semantic Tagging

In collaboration with OP, SEMIC has been exploring how to use AI to facilitate the generation of semantically rich tags for datasets published on the European open data portal.

Find out more about AI for Interoperability at SEMIC here

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Studies & research

To stay at the forefront of AI development, SEMIC has worked on developing analysis and research in the field of Generative AI, exploring how semantics can impact the performance of language models :

Domain adaptation: A study on the impact of domain adaptation for clustering tourism pledges was carried out on two state-of-the-art models.

Knowledge graphs: SEMIC started exploring the impact of knowledge graphs and semantics on the performance of RAG applications.
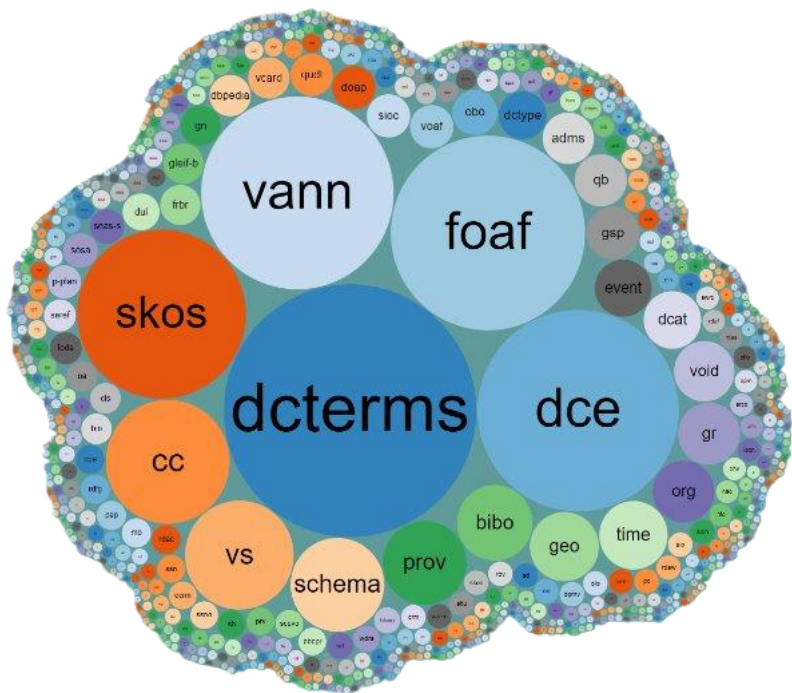
Find out more about the SEMIC studies here

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SEMIC Data Modelling Assistant
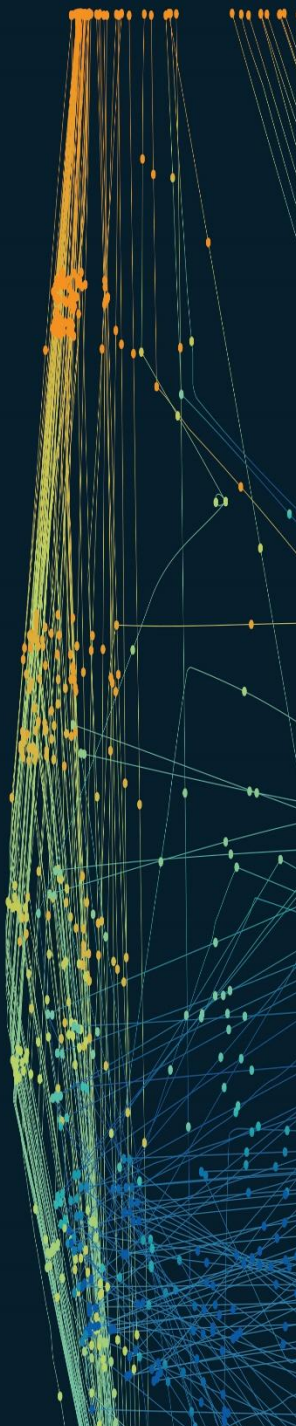
Why a data modelling assistant?

To assist data modellers, SEMIC has developed a prototype AI assistant that can **recommend classes, relationships, and properties** to be incorporated into a data model based on **existing concepts and standards.**
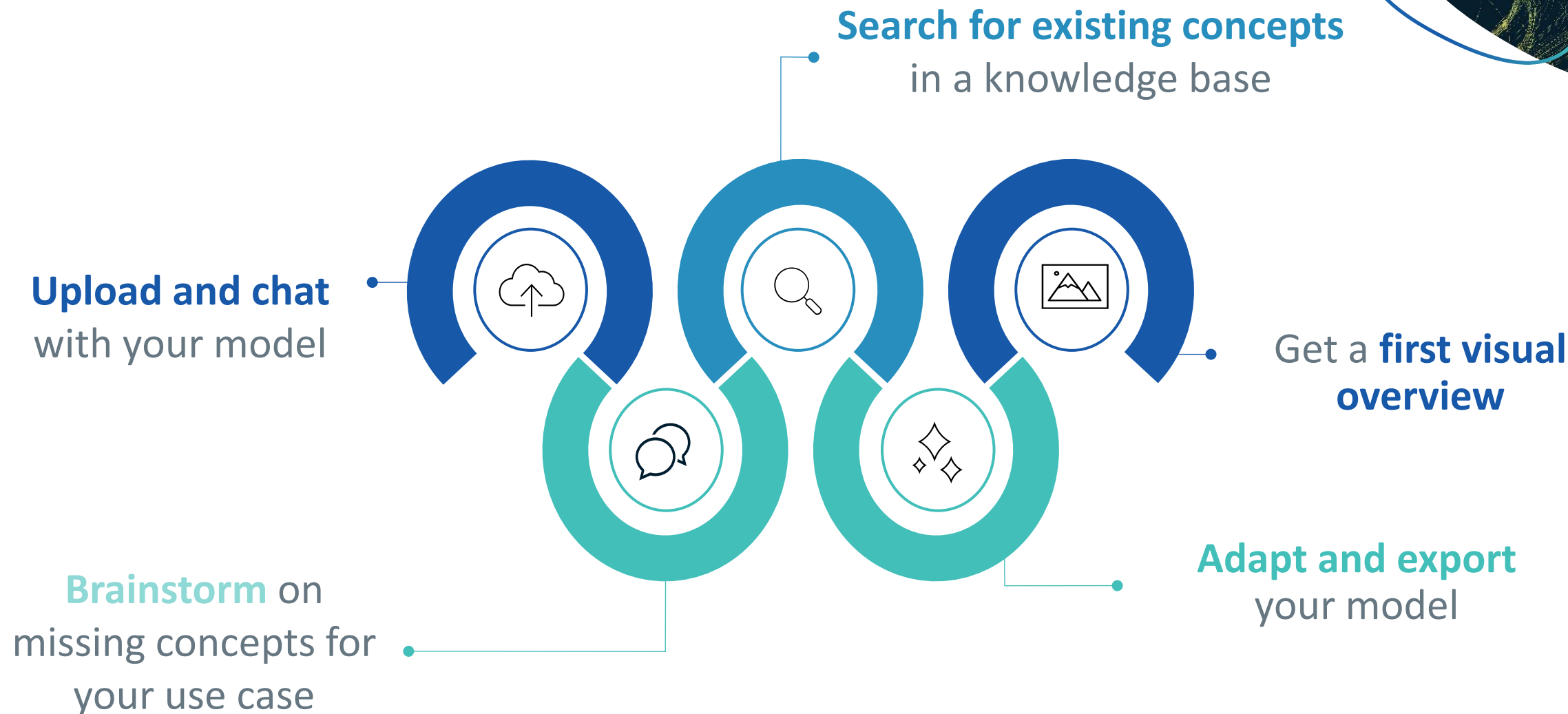

Suggest a possible name for a class: " *a requirement fulfill a _____* "

Suggest properties: *"by what a legal entity can be uniquely identified ?"*

Suggest a relation: *"a person is _____ at this address"*

Supporting the data modelling process

Search for existing concepts in a knowledge base

Upload and chat with your model

Get a **first visual overview**

Brainstorm on missing concepts for your use case

Adapt and export your model

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Creating a knowledge base of data models

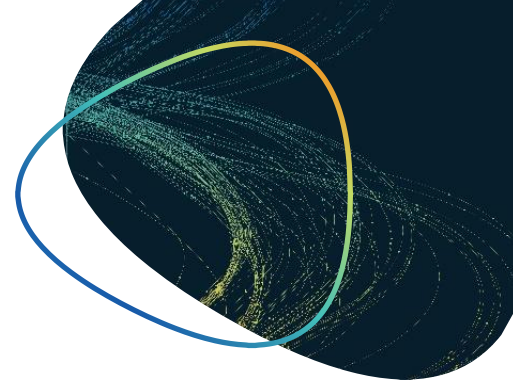| Status	Data source
☑	Core Asset Vocabulary
☑	Core Business Vocabulary
☑	Core Criterion and Core Evidence Vocabulary
☑	Core Location Vocabulary
☑	Core Public Event Vocabulary
☑	Core Public Service Vocabulary
☑	Core Person Vocabulary
☑	Core Public Organisation Vocabulary
☑	Core Vocabularies
☑	Schema.org
☑	LOV

HTML sources around existing SEMIC specifications and relevant legislations were identified, scraped, chunked, and indexed

RDF files containing existing data models and concepts that could be reused

Leveraging MCP and agentic AI

MCP Client

User Interface   LLM orchestrator   Documentation

Toolbox

Search through index	Data model reader	User's data model
Modify data model	Different checks	Documentation
Visualise data model	Search through graph	

Resources

MCP Server
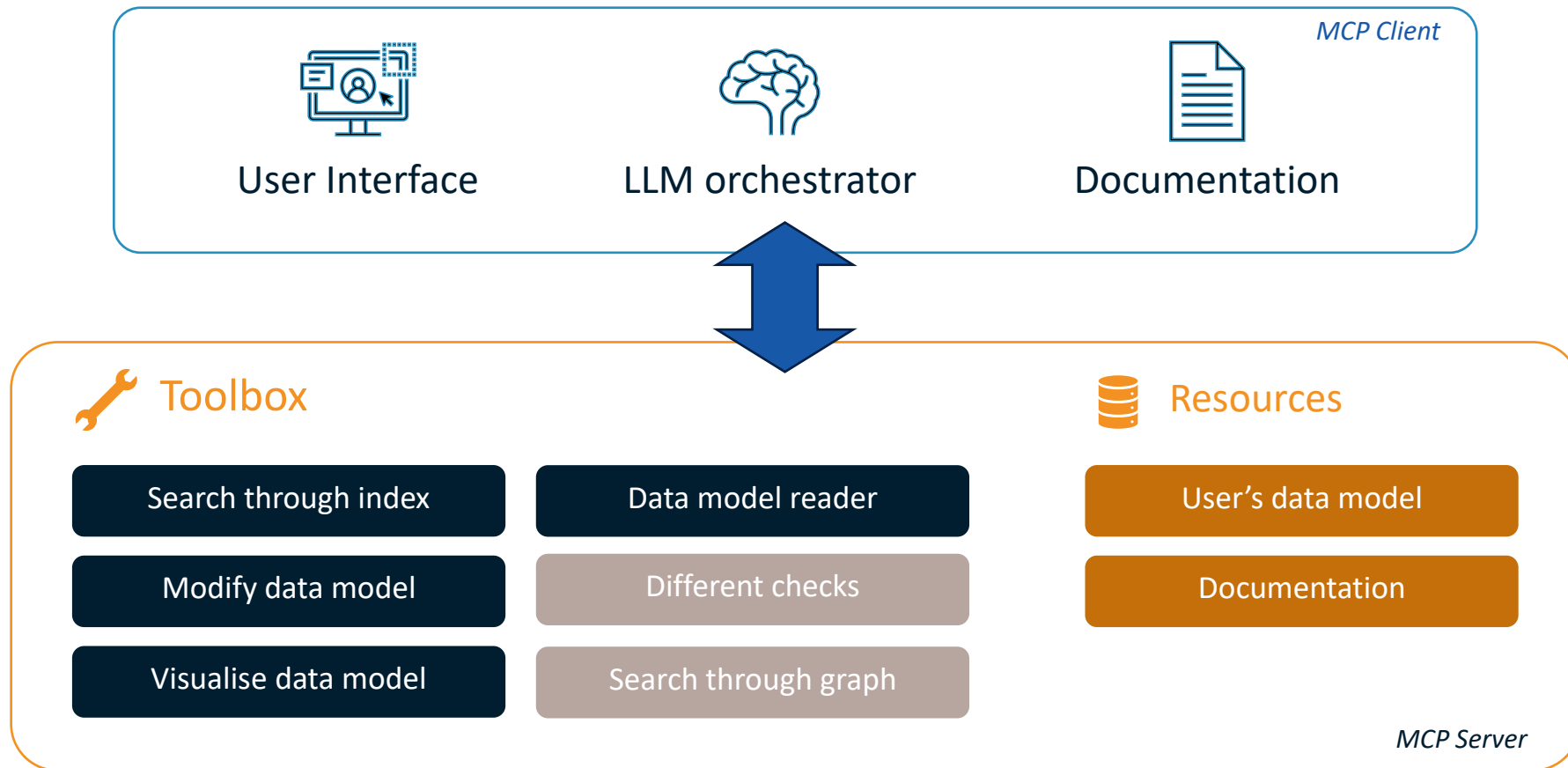
SEMIC Data Modelling Assistant - DEMO

Development of data models

Leveraging the different tool available within the MCP, the SEMIC assistant can help a data modeller define its model by:

- Exploring your current classes, properties, …
- Brainstorming about your use case
- Brainstorming about missing elements.
- Identifying existing concepts
- Finding relevant standards to look at.
- Implementing modifications.

Validation of data models

Based on a set of criteria (to be defined), the user can also use the SEMIC assistant to compare their model against various available standards:

- Compare their model to another standard.
- Assess the quality of the current metadata.
- Check the reuse of an existing standard.

SEMIC Data Modelling Assistant - DEMO
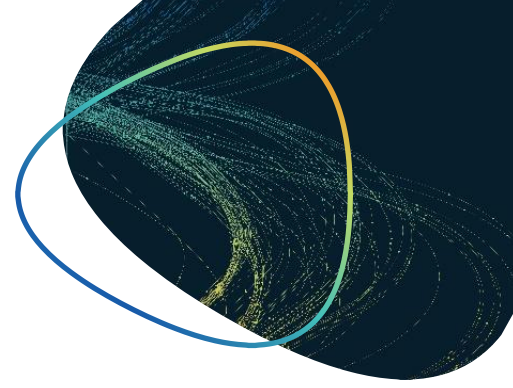
Accessing SEMIC Data Modelling Assistant

The current version of the SEMIC Assistant, including the features presented, is not yet publicly available. However:

Access to the tool: Access can be granted to the current version deployed in a dedicated test environment.

Access to the code: The SEMIC team is working to remove all dependencies on proprietary solutions within the chatbot's code. Once this process is complete, the code will be published on SEMIC's GitHub repository for public access.

Thank you

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innovation ∞ govtech ∞ community

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DIGIT-INTEROPERABILITY@ec.europa.eu

https://joinup.ec.europa.eu/collection/interoperable-europe/interoperable-europe